

Studies on the freshwater and amphibious Mollusca of Poona with notes on their distribution—Part II

BY

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(With twenty-one figures in four plates)

INTRODUCTION

Earlier studies on the freshwater and amphibious Mollusca of Poona (Tonapi & Mulherkar 1963) and adjoining areas had revealed their occurrence in appreciable number both in species and genera. Further explorations and detailed systematic studies have now confirmed some of the earlier conclusions. A few of the specimens which were known to occur in this region have now been collected and some others form new records for this region. New populations of the small-sized species have also been detected. The true identity of a few genera with annectant forms and doubtful systematic position have now been determined. It is needless to emphasise the importance of such field studies on the freshwater and amphibious mollusca and their role in agriculture (*Achatina*), horticulture (*Opeas*; *Glessula*) and still others which are casual agents of well known diseases such as schistosomiasis.

METHODS OF STUDY

Methods of collection and localities explored for this study are essentially similar to those reported earlier (Tonapi & Mulherkar loc. cit.). The sketch map has already been provided in the paper under reference. The same contractions have been used to abbreviate the descriptive terms used in the present study. Measurements are those of single specimens. However, they represent a fairly average size of the species. It was noticed in the earlier studies that Indian ink line drawings do not always reflect the correct shape and fine contours of these delicate forms. In the present paper, therefore, actual photographs have been provided to facilitate their easy identification. Scale lines have been totally omitted since detailed measurements are given with the descriptions. The bracketed numbers indicate other localities where also a given species occurs.

SYSTEMATIC LIST OF THE SPECIES

| | | |
|----------|----|-------------------|
| Class | .. | Gastropoda |
| S. Class | .. | Prosobranchiata |
| Order | .. | Megagastropoda |
| Series | .. | Architaenioglossa |

Family CYCLOPHORIDAE

Cyclophorus (Glossostylus) indicus Deshayes. (Fig. 1 A & B)

Shell orbicular, turbinated, with an acute apex. Spire conical and composed of 6-7 convex whorls. Sutures hardly impressed. Body whorl distinctly inflated bearing a projecting keel in the circumference. Umbilicus very narrow and deep. External surface of shell covered, particularly near the sutures, with thick and thin transpiral striations. Circular aperture oblique to the axis with both lips thickened and reflected. Shell, fawn coloured but the lower part often mottled with dark brown flames. Banding conspicuous on the body whorl and surrounding the umbilicus. The original Latin description has been supplemented by Gude (1921) with additional information which is in French. However, the present description is based on shell characters.

Locality : This is an uncommon species and one comes across the dead/dry shells rather infrequently (30, 31).

Measurements : H—14 mm. ; DM—18 mm. ; AM—12 mm. ; AH—11 mm. ; AW—10 mm.

Family POTAMIASIDAE

Cyclotopsis semistriata (Sowerby). (Fig. 2 A and B)

Orbicular shell conspicuously and widely umbilicated. Spire depressed with obtuse apex. Whorls 4-5 inflated with distinct spiral surface striations, which are more prominent on the upper side while the lower surface is relatively smooth. Sutures distinct and well impressed. Circular aperture inclined and feebly acuminated at the upper part. Operculum spirally voluted. Shell whitish with straw colour and a series of pale brownish transpiral bands.

Locality : This species is quite common in the hill ranges. It has never been collected from plains, farms and fields (4, 5).

Measurements : H—8 mm. ; DM—16 mm. ; AM—12 mm. ; AH— 7 mm. ; AW—6.5 mm.

Family AMNICOLIDAE (HYDROBIIDAE)

Digoniostoma pulchella Benson. (Fig. 3 A and B)

This genus has been separated from such allied and related genera as *Bithynia*, *Alocinma* and *Hydrobiodes* on the basis of the lip characters. Shells broadly and irregularly ovate with apex slightly compressed. There are about 4-5 whorls of which the first two are not so conspicuous. Body whorl rather inflated. Sutures oblique linear and well impressed. Aperture small, oblique ovately round. Outer lip thickened and produced; its extremities subangulated. Columellar callus thickened and laminated in appearance. A distinct projection is developed where the columellar callus meets the lip. Umbilicus almost closed. The channel running forward from it is not well formed and is smaller.

Locality: These have been collected from several slow moving streams around Poona. They are also found sometimes associated with aquatic plants. Many have been collected from underside of stones in the dried up canals (27, 28, 29, 30).

Measurements: H— 3 ± 1 mm.; DM— 2 ± 5 mm.; dm— $1.5 \pm .2$ mm.; AH— $1.1 \pm .1$ mm.; AW— $.75 \pm .1$ mm.

Alocinma orcula (Benson) var. **producta** (Nevill). (Fig. 4 A and B)

Shells narrow and elongated. However, they have typical globose or subglobose appearance. Whorls somewhat tumid with body whorl rather more inflated. Sutures rather wide. Aperture ovate and oblique to the axis. In this genus the peristome is neither thickened nor attenuated. The columellar fold is never prominent though always forming a ridge. The umbilicus is rimate and almost entirely closed. The groove proceeding downwards from the umbilicus is not so well defined. Shell sculpture microscopic. Operculum incapable of withdrawal into the shell; its nucleus is eccentric with concentric spiral lines on both surfaces.

Locality: An abundant species in slow moving streams. Often found under stones in streams and canals. Any place is good enough for collection (28, 29, 30).

Measurements: H— $6 \pm .5$ mm.; DM— $3 \pm .5$ mm.; dm— $2.5 \pm .1$ mm.; AH— $1.5 \pm .1$ mm.; AW— $1.1 \pm .1$ mm.

Family MELANIDAE

Paludomus obesa (Philippi). (Fig. 5 A and B)

Shell oblong, thick and solid with transpiral ridges. Three to four rather depressed whorls (probably more in perfect shells); upper ones

often eroded, damaged and missing. Whorls regularly convex. Body whorl at least subangular. There are distinct transpiral striae and grooves on the shell. Aperture oblong ovate with vertical lip. External margin sharp. Columellar slightly thickened and white. Shell yellow olive, occasionally smoky brown.

Locality: Rather common in Poona and noticeable around hill streams and rock pools during the wet season. Often washed down to the plains (12, 13, 17, 31).

Measurements of eroded shells: H—12·5 mm.; DM—6 mm.; dm—5·5 mm.; AH—5 mm.; AW—3·5 $\frac{1}{2}$ mm.

Subclass Pulmonata

Order Stylomatophora

Series Vertiginacea

Family ENIDAE

Rachis punctatus (Anton.). (Fig. 6 A and B)

Shell ovately conical with an elevated spire forming an obtuse apex. Six whorls with almost flattened walls. Aperture oblique-ovate with sharp outer lip and the columellar lip reflected over the umbilicus. Shell surface smooth and glossy; striae fine and microscopic. Shell pale fuscous white with a fine transverse line of infraperipheral brownish band. This is perhaps the most distinctive character of the species. Often an additional narrow band below the principal is also known to occur in some specimens. But this variety has not been noticed from this region. The recorded variety with a single band occurs in large numbers especially during the rainy months. They are known to hibernate during the other seasons. Considerable variation in the size of the shell has been noticed as recorded below.

Locality: This species is perhaps the commonest in Poona during the rainy season. It has been collected from localities with abundant luxuriant vegetation (4, 5, 14, 18, 19, 20).

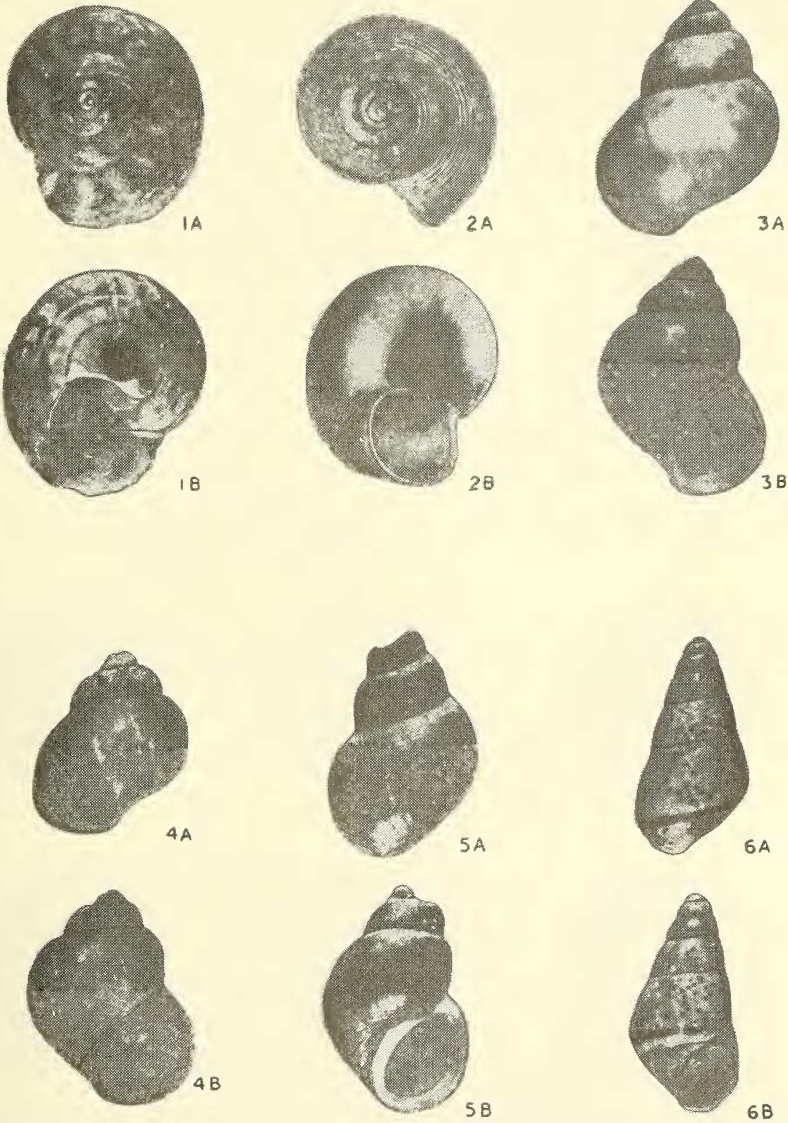
Measurements: H—10±3 mm.; DM—5±1 mm.; dm—4±1 mm.; AH—4·5±·5 mm.; AW—2·5±·5 mm.

Series Achatinacea

Family GLESSULIDAE

A large number of species of this interesting family has been recorded from Poona proper and many from the adjoining districts. However,

Tonapi: Mollusca of Poona



1 A & B. *Cyclophorus (Glossostylus) indicus* Deshayes $\times 4$; 2 A & B. *Cyclo-
topsis semistriata* (Sowerby) $\times 4.0$; 3 A & B. *Digoniostoma pulchella* Benson
 $\times 8.0$; 4 A & B. *Alocinma orcula* (Benson) var. *producta* (Nevill) $\times 10$;
5 A & B. *Paludomus obesa* (Philippi) $\times 6$; 6 A & B. *Rachis punctatus* (Anton) $\times 8$.

Tonapi: Mollusca of Poona



7A



8A



9A



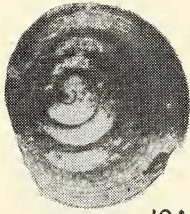
7B



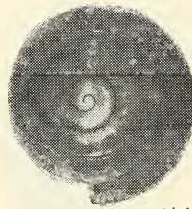
8B



9B



10A



11A



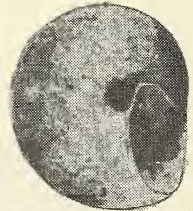
12A



10B



11B



12B

7 A & B. *Glessula* (*Glessula*) *notigena* Benson $\times 4$; 8 A & B. *Glessula* (*Glessula*) *ceylanica* Pfeiffer $\times 5$; 9 A & B. *Glessula* (*Rishetia*) *dikarngense* Godwin-Austen $\times 6$; 10 A & B. *Sitala densilirata* Preston $\times 18$; 11 A & B. *Kaliella bullula* (Hutton) $\times 17$; 12 A & B. *Macrochlamys* (*Macrochlamys*) *tenuicola* (Adam) $\times 9.5$.

these records relate to conditions over five decades ago. It is interesting to note that rapid urbanisation and industrial growth have contributed in no small measure to the displacement and perhaps to some extent extinction of many species. The *Glessula* are a case in point. Where I had once collected these delicate animals now stands a large industrial house, surrounded by housing colonies. Some of the well known recorded species are *Glessula hebes* Pfeiffer (see Gude loc. cit., p. 380); *G. tornensis* Blanford (p. 389); *G. singhurensis* Blanford (p. 419); *G. pulla* Blanford (p. 430); *G. brevis* Pfeiffer (p. 439); *G. rugata* Blanford (p. 443). The present records make new additions to the rich Glessulid fauna of Poona and environs.

***Glessula (Glessula) notigena* Benson. (Fig. 7 A and B)**

The imperforate shell is elongated, conical with an attenuated apex. Spire slender, turretted with obtuse apex. Sutures rather deeply impressed with about 9-10 whorls which are feebly convex. The body whorl is not so tumid. The last whorl is $\frac{1}{3}$ of the rest. Aperture rather oblique and semiovate. The peritremal margin is acute and thin while the columellar margin and the columella are curved and truncated obliquely near the base. The shells are horny brown glossy with crenulations particularly near the sutures. Some have even a fulvous horny colour.

Locality: These are common in the open country around Poona especially under trees. Abundant in the rich humus of dead and decaying leaves under vegetation (4, 5, 14, 15, 20).

Measurements: H—18 mm.; DM—7 mm.; dm—5 mm.; AH—5 mm.; AW—4 mm.

***Glessula (Glessula) ceylanica* Pfeiffer. (Fig. 8 A and B)**

Shell imperforate ovately oblong with a pyramidal spire. Apex obtuse and conical. There are about seven convex whorls, the last being about $\frac{3}{7}$ of the total length. Aperture semioval and obliquely pyriform. Columella deeply arched and basally truncated, rather abruptly. Shells not markedly sculptured though closely and minutely striated with crenulations near the sutures. Lustrous with characteristic horny brown glossy appearance. This species has also not been recorded from Poona and the measurements are smaller than those given by Gude (1914).

Locality : These occur along with the preceding species.

Measurements : H—14 mm. ; DM—7 mm. ; dm—3·5 mm. ; AH—5 mm ; AW—3 mm.

Glessula (Rishetia) dikarnense Godwin-Austen. (Fig. 9 A and B)

This species has not been dealt with by Gude (1914). The shells are quite small and appear pupiform. The shell is elongately conoid, rather ovate, thick, opaque and extremely variable in ground colour. There are about $7\frac{1}{2}$ -8 whorls increasing slowly at first the last two inflate rather suddenly. The body whorl more than equals $\frac{1}{3}$ of the shell. Spire conoid with flattened sides and angular apex. Aperture obovate and rather oblique. The outer peristomal margin is thickened while the basal margin is curved and arcuate. Columella obliquely truncated. Coloration varies from dull white, dark brown, greenish corneous to dark fuscous.

Locality : The species occurs in the same areas as in the preceding species and does not show any specific habitat preference.

Measurements : H— 9 ± 1 mm. ; DM— $2\cdot 5\pm\cdot 5$ mm. ; dm— $1\cdot 5\pm\cdot 1$ mm. ; AH— $1\cdot 7\pm\cdot 1$ mm. AW— $1\cdot 1\pm\cdot 1$ mm.

Series Ariophantacea

Family ARIOPHANTIDAE

Sitala denselirata Preston. (Fig. 10 A and B)

Shell trochid with the spire conical. Body whorl convex basally. Whorls 5-6 with not so convex sides and nearly flat. The last slightly carinated peripherally. Apex obtuse. The sutures are well impressed. The aperture is diagonal almost semicircularly lunate. The peristome is thin with reflected columellar margin. The shell is obliquely transpirally striated. The shell is whitish horny and semitranslucent. Only two shells are in the collection.

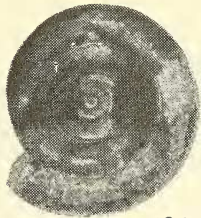
Locality : 28, 29, 30.

Measurements : H— $2\cdot 25$ mm. ; DM— 75 mm. ; dm— $1\cdot 1$ mm. ; AH— $\cdot 65$ mm. ; AW— $\cdot 45$ mm.

Kaliella bullula (Hutton). (Fig. 11 A and B)

This species also forms a new record. The shell is semiperforated with globose, turbinated and trochiform appearance. The spire is conical with obtuse apex. There are five whorls with convex slides. The

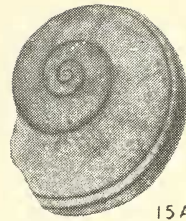
Tonapi : Mollusca of Poona



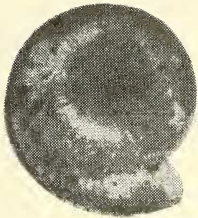
13A



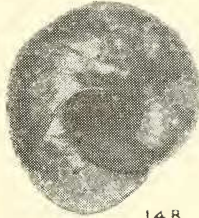
14A



15A



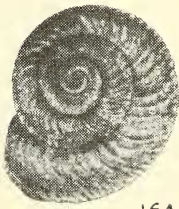
13B



14B



15B



16A



17A



16B



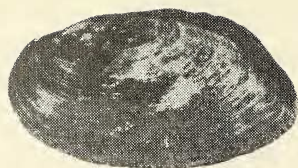
17B

13 A & B. *Macrochlamys (Eurychlamys) platychlamys* Blanford $\times 7.5$; 14 A & B. *Xesta (Fretum) semirugata* (Beck) $\times 2.2$; 15 A & B. *Ariophanta bistrialis* (Beck) $\times 2.75$; 16 A & B. *Planispira (Trachia) crassicostata* (Benson) $\times 5.0$; 17 A & B. *Eulota sculpturita* (Benson) $\times 2.75$.

Tonapi: Mollusca of Poona



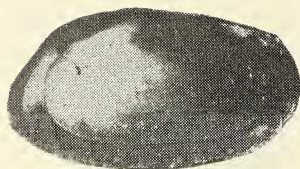
18 A



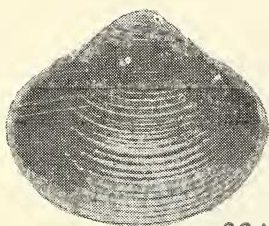
19 A



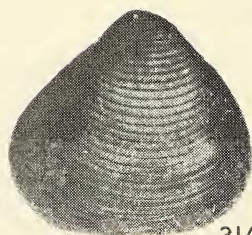
18 B



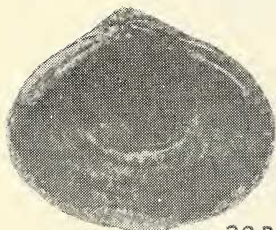
19 B



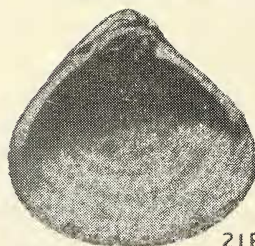
20 A



21 A



20 B



21 B

18 A & B. *Indonaia coerulea* (Lea.) $\times 1.65$; 19 A & B. *Lamellidens consobrinus* (Lea.) $\times 1$; 20 A & B. *Corbicula striatella* Deshayes $\times 3$; 21 A & B. *Corbicula peninsularis* Prasad $\times 3$.

sutures are well impressed. The body whorl is slightly angulate at the periphery, and convexly inflated below the keel. Aperture oblique and broadly crescent-shaped. Peristome simple, thin, with slightly reflected columellar margin. Shell horny and not so opaque, finely sculptured with fine oblique ribs on the upper surface while indistinct concentric striae traverse the basal surface. Only one shell was obtained.

Locality : The area of collection is the same as in the preceding species.

Measurements : H—2+1 mm. ; DM—2.5+2 mm. ; dm—1.5+2 mm. ; AH—3+1 mm. ; AW—2+1 mm.

Macrochlamys (Macrochlamys) tenuicola (Adam). (Fig. 12 A and B)

Shell openly perforated with turbinate subglobose shape; apical region convexly rounded; spire subconical with 5-6 convex whorls obtuse apex and well impressed sutures. Body whorl distinctly angulated and has a developed peripheral keel, the basal part below the keel convex and glossy. Aperture oblique and broadly crescent-shaped. Peristome thin, sharp-edged, while the columellar margin is curved and reflected over the umbilicus. Shell is glossy, translucent, with a pale fulvous horny colour. The upper whorls are covered with fine microscopic striae.

Locality : This species is quite common (2, 4, 5, 19, 20, 23, 28, 29, 30).

Measurements : H—4 mm. ; DM—7 mm. ; dm—4 mm. ; AH—2.5 mm. ; AW—1.7 mm.

Macrochlamys (Eurychlamys) platychlamys Blanford. (Fig. 13 A and B)

Shell depressedly conoid and openly perforate. Spire low with obtuse apex. There are five feebly convex whorls. Sutures not well impressed. Body whorl rounded at the periphery and convex beneath, the oblique aperture is lunately suboval. Peristomal lip thin, with curved margin while the columellar margin is diagonal and expanded over the umbilicus. The shell is thin, smooth, translucent and fulvous horny coloured.

Locality : This fragile species is common during the wet months. Dry shells are common in other seasons (4, 5, 19, 20).

Measurements : H—5+1 mm. ; DM—9+1 mm. ; dm—7+1 mm. ; AH—3.5+5 mm. ; AW—2+5 mm.

Xesta (Fretum) semirugata (Beck.). (Fig. 14 A and B)

Shell openly perforated, somewhat variable in the elevation of its spire. Conoidal globose or depressedly conoid with dull brown or white

colour. There are 5-6 convex whorls of which the body whorl is much swollen and descends near the aperture. Sutures are not well impressed. Shell finely decussated with oblique striae and occasional transpiral lines, relatively smooth below. The aperture is broadly crescent-shaped. The peristome is thin and that on the columellar side is reflected near the umbilicus.

Locality : This is one of the common species (5, 14, 15, 30, 31).

Measurements : H— 20 ± 5 mm. ; DM— 25 ± 3 mm. ; dm— 21 ± 2 mm. ; AH— 15 ± 1 mm. ; AW— 10 ± 1 mm.

Ariophanta bistrialis (Beck.). (Fig. 15 A and B)

Shell normally perforated, round or globosely depressed. The spire is very low and the $4\frac{1}{2}$ flat whorls increase in diameter rather rapidly. Body whorl does not descend, and is convex beneath. Aperture large, oblique and lunately oval. Peristome thin and columellar margin slightly reflected. The shell is relatively thin, pale horny and finely striated above the well impressed spiral lines. Two rufous lines separated by a whitish band between them is the usual form available in Poona.

Locality : This is perhaps the most common Ariophantid available in Poona area. The specimens of this species frequent particularly the gardens and parks.

Measurements : H— 14 ± 2 mm. ; DM— 20 ± 5 mm. ; dm— 26 ± 2 mm. ; AH— 12 ± 3 mm. ; AW— 9 ± 2 mm.

Series Heliacea

Family HELICIDAE (PLEURODONTIDAE ?)

Planispira (Trachia) crassicostata (Benson). (Fig. 16 A and B)

Shell moderately sized, circular and has a perspective umbilicus. Shell depressed with almost flattened spire which is hardly elevated. There are four whorls ; the last or body whorl is carinated. The surface is finely transpirally striated and oblique ribbing inconspicuous. Aperture subhorizontal, oval, and transversely rounded. The margins of the peristome approach each other and the columellar side overhangs the umbilicus which is infundibuliform.

Locality : Live specimens are common in the hill ranges in the rainy season. Dead shells can be collected from several other localities (4, 5, 10, 16, 19).